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PROBLEMS FOR SOLUTION.

ARITHMETIC.

152. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

An operator on 'Change gains 5% on his *daily capital* every *odd* day of a business-week, and loses 5% of the same capital every *even* day of same week. What per cent. of his *original capital* will he have gained, or lost, at the end of a business-week ?

153. Proposed by J. C. CORBIN, Pine Bluff, Ark.

Find some two-figure numbers, such that if they be squared, then the figures interchanged and the resulting numbers squared, the resulting products will consist of the same digits in reversed order.

ALGEBRA.

153. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

Eliminate x, y, z from the equations,

$$x^2+yz=a,$$
$$y^2+xz=b,$$
$$z^2+xy=c,$$
$$x+y+z=0.$$

154. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

Show that the equation, $x^4+qx^2+s=0$ ...(1), can not have three *equal* roots.

155. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio University, Athens, O.

If the roots of the cubic $x^3+3px^2+3qx+r=0$ be in harmonical progression, $2q^3=r(3pq-r)$.

156. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics in Drury College, Springfield, Mo.

$(z+x)a-(z-x)b=2yz$.

CALCULUS.

145. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics in The Temple College, Philadelphia, Pa.

Find the surface bounding the volume required in problem 102.

146. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

$$I=\int_0^{\frac{1}{2}\pi} \sqrt{[(p+\tfrac{1}{4}q^2)-(\tfrac{1}{2}q+\cos\theta)^2]}\,d\theta=\text{what ?}$$